STUDIES IN AUSTRALIAN LICHENS II.†

The Alpine Lichen *Thamnolia vermicularis* (Sw.) Shaer. in Australia

by

REX B. FILSON*

Thamnolia, which has a world wide distribution in alpine and sub-alpine habitats was first collected in Australia by Baron Ferdinand von Mueller on the Cobboras Mountains in early February 1854 during his 2,500 mile epic journey around the State of Victoria. The range of this lichen is very limited and it grows only in the sub-alpine areas of Southern New South Wales, North-eastern Victoria and Central and South-eastern Tasmania. It occurs on most mainland peaks above 5,600 feet, where it favours *Poa* tussock grassland. In Tasmania the

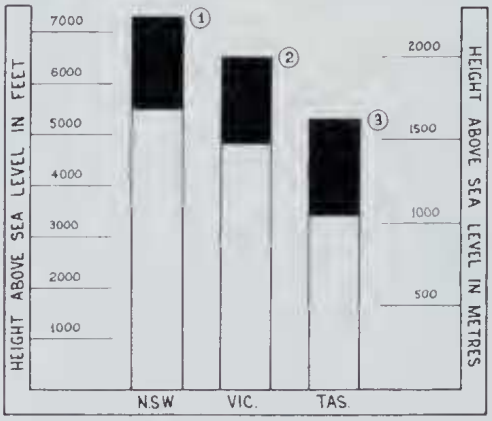


Fig. 53—Altitudinal range (in black) of *Thamnolia vermicularis* in Australia. 1. Mount Kosciusko 7,314 feet (2293m) 2. Mount Bogong 6,509 feet (1984m) 3. Mount Ossa 5,305 feet (1,617m).

distribution is limited further as it does not appear to grow in the wilderness areas of the South-west. It is absent from the Hartz Mountains area, Mount Solitary, Frankland Range and the Ranges to the south. The most southerly record is on the Mount Wellington Range to the west of Hobart. Figure 53 illustrates the altitudinal range for each of these three States.

There has been much discussion in recent papers on the validity of Chemical 'species', some authors considering different chemo-types to be specific, whilst others prefer to refer to them as chemical strains.

† Studies in Australian Lichens I. *Victorian Naturalist* 87:324-27 (1970).

* National Herbarium of Victoria.

Thamnolia, once thought to be monotypic, has been subdivided into two distinct species on the basis of chemistry. *Thamnolia vermicularis* (Sw.) Schaer. contains thamnolic acid and *Thamnolia subuliformis* (Ehrh.) W.Culb contains squamatic acid and baeomycic acid. These two 'species' are easily distinguished by testing the UV reaction (Sato 1963). The present author prefers to consider these two entities merely as chemical strains and in this paper will refer to them as 'chemical strain vermicularis' or UV —, and 'chemical strain subuliformis' or UV +.

There appears to be no significant macroscopic difference between these two taxa, Dr. G. C. Bratt (in litt.) suggests that the medulla is thicker in the UV + specimens, but the author has found thin medulla in UV + samples as well as thick medulla in UV —.

Sato (1965), in a paper entitled *The Mixture ratio of the Lichen Genus* Thamnolia *in New Zealand*, shows that the percentage of UV + specimens found in Australia is ca.17%. He also states that this is consistent with the world wide distribution of the genus. It must be pointed out that 'chemical strain vermicularis' grows profusely in its limited habitats on the Australian mainland, colonies sometimes attaining several square metres in area. Whilst the author has examined large quantities of this lichen under UV radiation, no plus specimens have been located. 'Chemical strain subuliformis' on the other hand occurs in three isolated localities in Tasmania. In these localities it is not plentiful, occurring only in single strands or in a small tuft here and there. 'Chemical strain vermicularis' has been found in association with it at these localities and occurs independently in numerous other areas. It seems evident that the percentage of UV + specimens in Tasmania is far lower than twenty-five (Sato, 1968 : 328) and certainly much lower than seventeen per cent. for the whole of Australia.

Thamnolia vermicularis (Sw.) Schaer. *Enumer. Critic. Lich. Europ.* 243 (1850).

Thallus variable, sometimes fruticose, in dense clumps up to 15 cm. tall, sometimes in single strands lying on the substrate, greyish-white in the upper part, pinkish in the lower, sometimes simple, tapering upwards to a fine point, sometimes irregularly branched, sometimes uniform in thickness, 1·5–2·0 mm diam., sometimes swollen in the upper parts to as great as 5 mm. *Cortex* up to 30 μ thick. *Algal layer* up to 60 μ thick, discontinuous, of cells 12–15 μ diam. *Medulla* compact, horny, up to 300 μ thick, hyphae longitudinally arranged 2–2·5 μ thick. *Inner surface* ecorticate.

Apothecia not seen.

Reactions :

'Chemical strain vermicularis'—K + deep yellow, P + yellow becoming orange. UV — or faintly + on the inside of the thallus tube.

'Chemical strain subuliformis'—K + pale yellow, P + yellow becoming deep yellow-gold. UV + intense white.

SPECIMENS EXAMINED :

NEW SOUTH WALES—Mount Gingera, Brindabella Range, *Rex Filson* 11442, 13.i.1970 (MEL 1010917) ; Snowy Mountains (MEL 9375) ; Snowy Mountains, *W. Bauerlin* 143, March 1890 (MEL 9381); Summit of Mount Jagungal, Snowy Mountains, *Rex Filson* 10209, 16.iii.1967 (MEL 19704); on the spur between the main and northwest peaks of Mount Jagungal, Snowy Mountains, *Rex Filson* 10201, 16.iii.1967 (MEL 19719) ; Charlot's Pass on the Kosciusko road 24 miles south of Jindabyne, *Rex Filson* 7907, 2.xii.1965 (MEL 19691) ; Charlot's Pass, to the north of the Kosciusko road, Kosciusko State Park, *Rex Filson* 11498, 15.i.1970 (MEL 1010916) ; on the south-western slopes of Mount Twynam, Kosciusko State Park, *Rex Filson* 10133, 14.iii.1967 (MEL 19718);

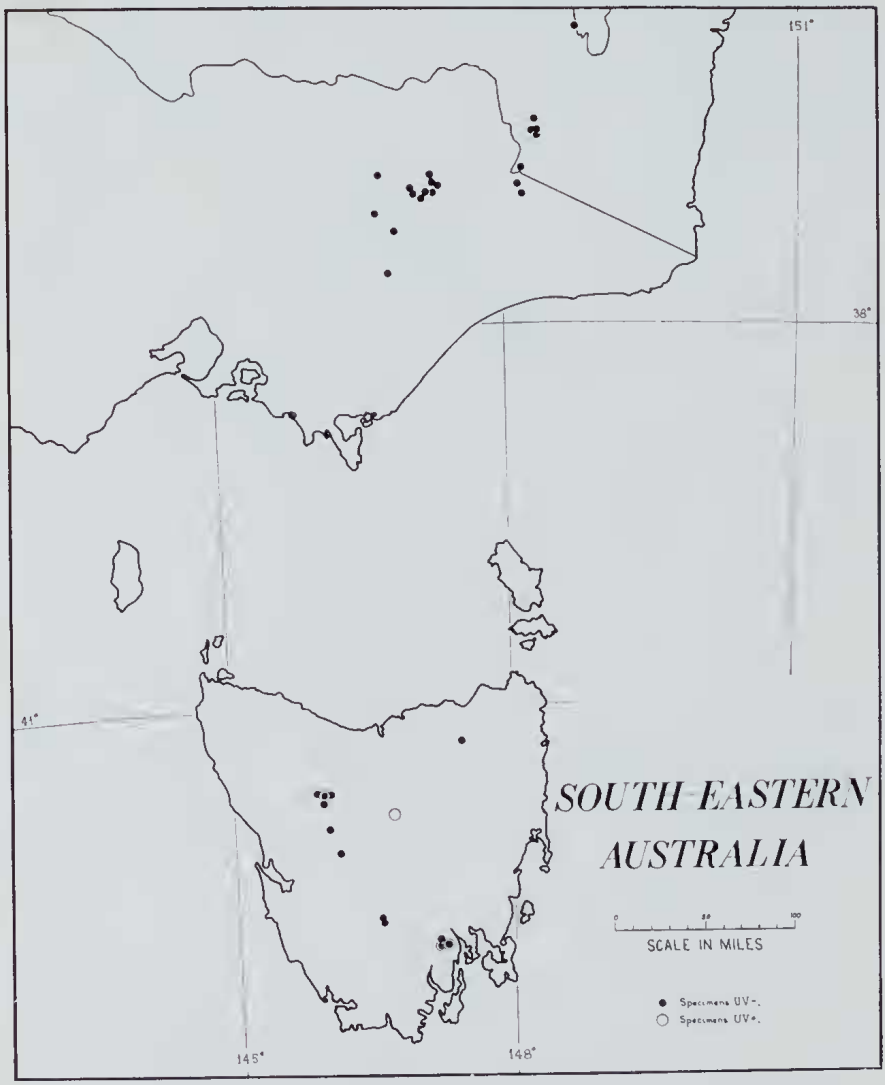


Fig. 54—The known distribution of *Thamnolia vermicularis* in Australia.

North-western side of Mount Northcote, Kosciusko State Park, *Rex Filson* 10091, 11.iii.1967 (MEL 19702); Mount Kosciusko, *W. Bauerlin* (MEL 9377); eastern side of the Crackenback Range, Snowy Mountains, *Rex Filson* 10018, 11.iii.1967 (MEL 19701); Mount Gungarten, Snowy Mountains, *Rex Filson* 10235, 18.iii.1967 (MEL 19703); on outcrop of rock to the east of Rawson's Pass, Kosciusko State Park, *Rex Filson* 11525, 15.i.1970 (MEL 1010920); slopes below ridge of Ramsbead Range just east of Spencer Creek Crossing between Perisher Valley and Charlot's Pass, Kosciusko State Park, *W. A. Weber and D. McVean*, University of Colorado Exsiccati 226, 4.i.1967 (MEL 32468); The Pilot, *Rex Filson* 9948, 20.ii.1967 (MEL 19684).

Victoria—Mount Nelse, Bogong High Plains, *Rex Filson* 8123-8128, 20.i.1966 (MEL 19673, 19676, 19677, 19692, 19693, 19695); "Helipterum Hill" south of Mount Nelse, Bogong High Plains, *A. C. Beauglehole* 15677, 27.i.1966 (MEL 27864); Mount Buffalo, *P. Bibby*, 25.i.1946 (MEL 20231); Basalt Hill, Bogong High Plains, *A. C. Beauglehole*, 29.i.1967 (MEL 18754, 19474); head of Middle Creek on the south side of Basalt Hill, Bogong High Plains, *J. H. Willis*, 17.i.1947 (MEL 19674); Basalt Hill, Bogong High Plains, *Rex Filson* 9496, 22.i.1967 (MEL 19681); Cobboras, *Ferd. Mueller*, 1854 (MEL 9380); Cobboras Mountains, *J. H. Willis*, 10.ii.1946 (MEL 25968); Summit of the Cobboras, *N. A. Wakefield*, 29.i.1949 (MEL 19679); on the northern granite lumps of the Cobboras, *Rex Filson* 9998, 21.ii.1967 (MEL 19682); Mount Feathertop, *J. R. Tovey* (MEL 9379); 50 feet below the summit of Mount Feathertop, on the eastern side in the vicinity of Hellfire Gully, *Rex Filson* 9864, 17.ii.1967 (MEL19683); Twin Knobs on the Razorback between Featbertop and Hotham, *Rex Filson* 9894, 18.ii.1967 (MEL 19685); Razorback, between Mount Hotham and Mount Featbertop, *J. H. Willis*, 13.ii.1966 (MEL 19687); Mount McKay, Bogong High Plains, *Rex Filson* 9654, 27.i.1967 (MEL 19686); Mount Cope, Bogong High Plains, *Rex Filson* 8093, 19.i.1966 (MEL 19694); Mount Cope, Bogong High Plains, *A. C. Beauglehole* 15566, 26.i.1966 (MEL 27840); The Peak, north end of Mount Wombargo, *Rex Filson* 8271–8274, 5.iii.1966 (MEL 19688, 19689, 19690, 19696); Wombargo Peak, above Little River, *J. H. Willis*, 4.xii.1962 (MEL 19678); Mount Higgenbotham, *Rex Filson* 9792, 16.ii.1967 (MEL 19672); northern end of the Cross Cut Saw, *Rex Filson* 9705, 14.ii.1967 (MEL 19680); steep face of "Gable Ends", Mount Wellington, *Stella M. Fawcett*, 3.ii.1940 (MEL 9376); along the ridge ca.3 miles south of Mount Darling, which is ca.11 miles south-east of Mount Howitt on the Main Divide, *Rex Filson* 12252, 6.iii.1971 (MEL 1010921).

Tasmania (UV −)—Mount Barrow, North-east, *G. C. Bratt* 3135, 30.i.1966 (G.C.B.)*; Hanson's Peak, North-west, *B. C. Bratt* 67/536, 8.xii.1967 (G.C.B.); Summit of Hanson's Peak, Cradle Mountain – Lake St. Clair National Park, *Rex Filson* 10701, 24.ii.1968 (MEL 1000000); summit of Mount Campbell, Cradle Mountain – Lake St. Clair National Park, *Rex Filson* 10833 & *Sue Filson*, 1.iii.1968 (MEL 1010914); on the Plateau between Barn Bluff and Cradle Mountain above Crater Cirque, *Rex Filson* 10791, 27.ii.1968 (MEL 1010912); rocky escarpment to the east of Hounslow Heath, Cradle Mountain – Lake St. Clair National Park, *Rex Filson* 10861 & *Sue Filson*, 2.iii.1968 (MEL 1010913); summit of The Acropolis, Cradle Mountain – Lake St. Clair National Park, *Rex Filson* 6938, 7.i.1965 (MEL 19675); on the plateau along the Mount Field West Track, Mount Field National Park, *Rex Filson* 10627 & *Sue Filson*, 20.ii.1968 (MEL 1010918); Mount Field West, Southern District, *G. C. Bratt* 3605, 10.xii.1966 (G.C.B.); Mount Field West, Mount Field National Park, *Rex Filson* 10608 & *Sue Filson*, 20.ii.1968 (MEL 1010919); Mount Mawson, Soutbern-central, *G. C. Bratt* 2938, 4.xii.1965 (G.C.B.); Mount Mawson, Mount Field National Park, *Rex Filson* 10586 & *Sue Filson*, 19.ii.1968 (MEL 1010915); tarn shelf near Mount Mawson, Southern-central, *G. C. Bratt* 67/658, 25.xii.1967 (G.C.B.); Mount Marion, Wellington Range, *G. C. Bratt* 1526, (G.C.B.); Mount Wellington, *F. R. M. Wilson*, March 1891 (MEL

* (G.C.B.) in Herbarium of Dr. G. C. Bratt, West Moonah, Tasmania.

9378) ; Mount Wellington, Panorama Track, *G. C. Bratt* 513, 25.viii.1963 (G.C.B.) ; Thark Ridge, Wellington Range, *G. C. Bratt* 2864, 14.xi.1965 (G.C.B.) ; Trestle Mountain, Wellington Range, *G. C. Bratt* 67/66, 5.ix.1967 (G.C.B.).

Tasmania (UV +)—Summit of Cradle Mountain, Cradle Mountain – Lake St. Clair National Park, *Rex Filson* 10757 & *Sue Filson*, 25.ii.1968 (MEL 1010911) ; Cradle Mountain, North-west, *G. C. Bratt* 3634, 17.xii.1966 (G.C.B.) ; Great Lake near Liaweenee, *G. C. Bratt* 68/23, 27.i.1968 (MEL 27359) ; Mount Wellington, Summit Plateau, *G. C. Bratt* 1870, 20.xii.1964 (G.C.B.) ; Mount Montague, Wellington Range, *G. C. Bratt* 2973, 19.xii.1965 (G.C.B.).

Acknowledgement

The author wishes to thank Dr. G. C. Bratt for assistance in collecting samples of *Thamnolia* in Tasmania, and for the loan of specimens from his private herbarium.

References

Sato, M. (1963)—Nova Hedwigia **5** : 149–155.
—— (1965)—The Bryologist **68** : 320–324.
—— (1968)—Journ. Jap. Bot. **43** : 328–334.
Thomson, J. W. (1968)—The Lichen Genus Cladonia in North America. Toronto. Canada.

Plate 21

Thamnolia vermicularis (Sw.) Schaer.

a. Typical clump of thalli from amongst Poa tussocks on the Bogong High Plains collected by A. C. Beauglehole (MEL 19474). (This clump illustrates the polymorphism of the individual strands showing both the simple tapering thalli and the large inflated forms.)

b. A branched inflated thallus separated out from the same clump.

c. A multiple branched mixture of fine tapering lobes and inflated thallus from the same clump.

d. A single simple strand tapering upwards to a fine point separated out from the same clump.

e. A longitudinal section through the tip of the thallus.

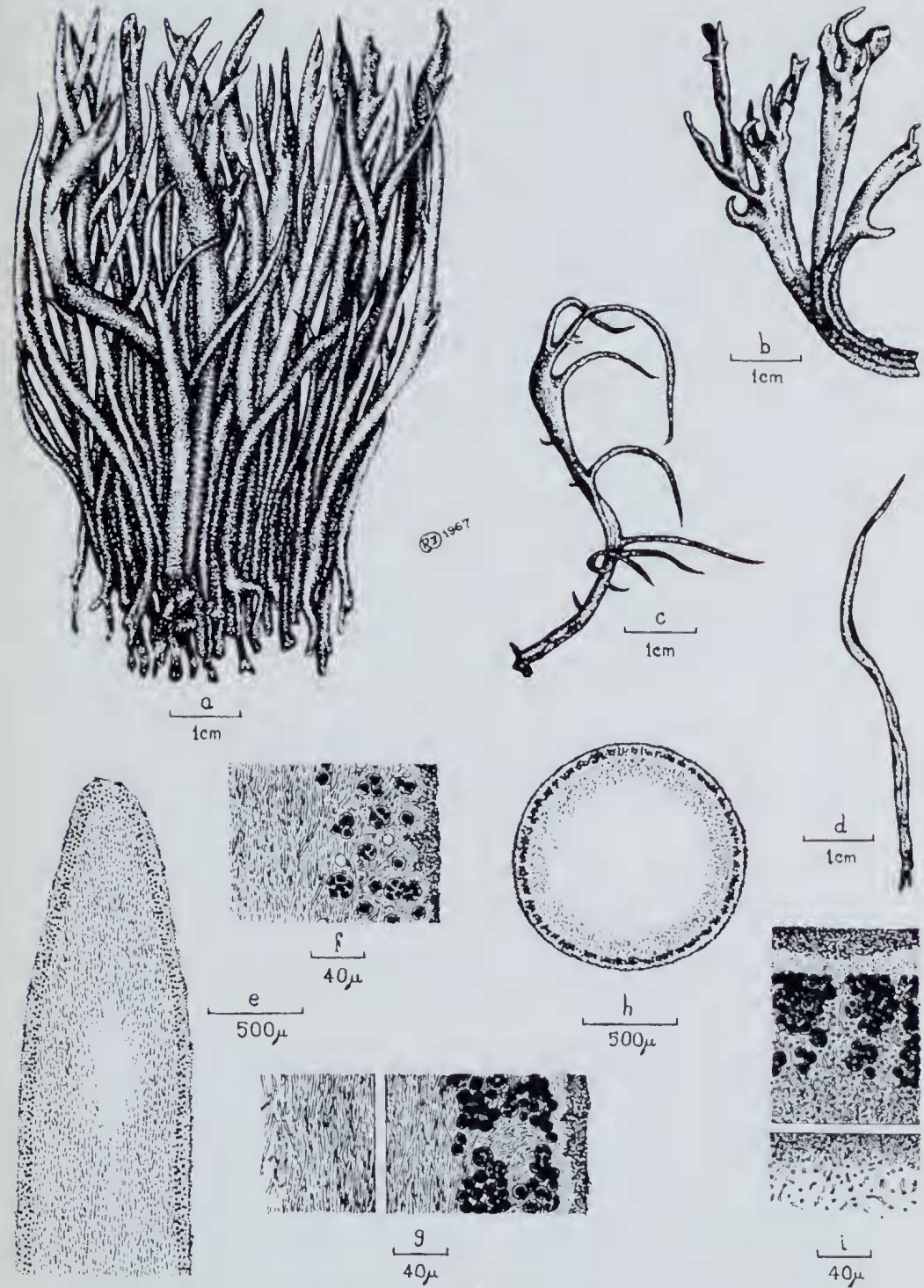
f. Enlarged portion from the above section.

g. Longitudinal section through the thallus, reduced in width.

h. Cross section through the thallus.

i. Enlargement of the cross-section, reduced in width.

PLATE 21



(For explanation see facing page)

Plate 22

(Crystals produced by substanecs in the mieroerystal test solutions).

a. Thamnolie aeid reerystallized in $Ba(OH)_2$ from the acetone extraet of MEL 19474, *Thamnolia vermicularis* UV–, collected on Basalt Hill, Bogong High Plains, Vietoria. *A. C. Beauglehole*.

b. Thamnolie aeid reerystallized in G.A.An. from the aeetone extraet of MEL 19691, *Thamnolia vermicularis* UV–, colleeted at Charlot's Pass, Koseiusko State Park, New South Wales. *Rex Filson 7907*. (These crystals form readily and were photographed after 35 minutes).

c. Squamatie aeid recrystallized in K_2CO_3 from the acetone extraet of MEL 1010911, *Thamnolia vermicularis* UV +, eollected on thc summit of Cradle Mountain, North-west Tasmania. *Rex Filson 10757*. (Aecording to Thomson (1968) these erystals should form rapidly but in this instanee development was very slow. The eharaeteristie brown, branehing, needle-shaped crystals were photographed after two and a half days).

d. Squamatie aeid reerystallizcd in G.E. from the aeetone extraet of MEL 1010911. *Thamnolia vermicularis* UV +. (The thin boat-shaped plates form quiekly and were photographed after 20 minutes).

e. Baeomyeie acid recrystallized in G.A.Q. from the acetone extraet of MEL 10067, *Thamnolia vermicularis* UV +. University of Colorado Exsieeati No. 37. Colorado U.S.A. (Thomson says that these crystals should form after two or three hours, eontrary to this our erystals formed almost immediately and were photographed after ten minutes. The erystals started as thin rhombie plates and soon grew to large elongated oblique-ended to round-ended elusters of plates).

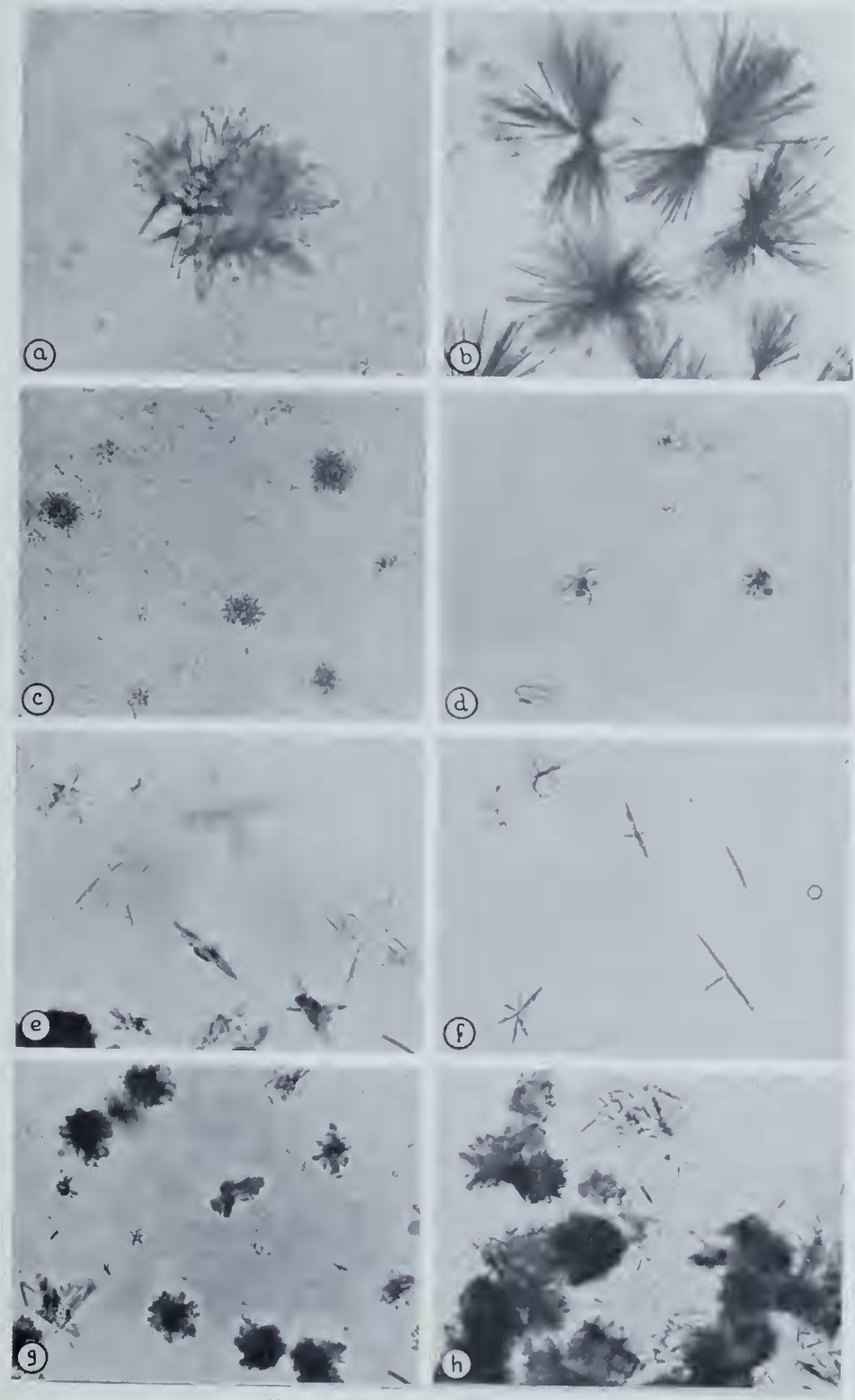
f. Baeomyeie acid reerystalled in G.A.An. from the aeetone extraet of MEL 1010911, *Thamnolia vermicularis* UV +. (Thcsc erystals are extremely slow in reerystallizing, this photograph was taken after 24 hours).

g. Squamatie aeid and Baeomyeie aeid reerystallized in G.A.Q. from the aeetone extract of MEL 1010911, *Thamnolia vermicularis* UV +. (These erystals formed fairly rapidly).

h. Unknown erystals reerystallized in G.A.An. from the aeetone extraet of MEL 1010911, *Thamnolia vermicularis* UV +. (These erystals formed overnight in both this speeimen and in the speeimen distributed in the University of Colorado Exsieeati No. 37, from Colorado U.S.A.).

Ba(OH)2—a saturated solution of barium hydroxide in water.
G.A.An.—Two parts glycerine, two parts alcohol, one part aniline.
G.A.Q.—Two parts glycerine, two parts alcohol, one part quinoline.
G.E.—One part glycerine, three parts glacial acetic acid.
K2CO3—a 10% solution of potassium carbonate in water.

Plate 22



(For explanation see facing page)

PRELIMINARY NOTICE ON THE SONDER COLLECTION IN THE NATIONAL HERBARIUM OF VICTORIA

by

A. B. COURT*

Almost the whole of the huge herbarium accumulated by O. W. Sonder (1812–81) lies in the general collections of the National Herbarium of Victoria, and its purchase by the Victorian Government towards the end of last century further enriched the excellent collections already acquired by Baron von Mueller. The history of its acquisition will be detailed by the author in another place and extensive notes on its contents will be published in due course. In the mean time, the following information is intended to provide a very brief guide to some of the more important elements that Sonder brought together over a period of nearly 50 years to form a collection that comprised about a quarter of a million sheets. This article also contains the first recent attestation concerning the whereabouts of the Sonder herbarium excluding the major part of his South African collection and other smaller segments and misleading assertions regarding the location of this famous herbarium are accordingly corrected.

1. *Scope.* Those regions explored principally by German botanists before about the eighth decade of last century are well represented (e.g., central Europe, South Africa, tropical South America and to a lesser extent Australia) but other regions are not so well covered. Sonder's collections embraced every major group of plants within both the cryptogams and phanerogams and contained thousands of autographic specimens from many well-known botanists.

2. *Specimens associated with Linné's Disciples.* Several hundred specimens belonging to this category have been located and most of them came from Thunberg but a few Ehrhart specimens (e.g., *Phytophylacium Ehrhartianum* and *Planta Cryptogamae Linnaeo*) and about 100 Gisecke cryptogams have been noted. Two genuine Linnean specimens and one from his son have been located.

3. *Lehmann Collections.* Sonder acquired several thousand sheets from J. G. C. Lehmann including most of his *Boraginaceae* (about 800 sheets). Presumably most of the specimens associated with Linné's disciples came through Lehmann.

4. *South African Collections.* The most important components of Sonder's South African collection were acquired by Stockholm many years before Melbourne received most of the remainder which still form a very important collection.

5. *Tropical South America.* There is a strong association between Sonder's herbarium and Martius's *Flora brasiliensis* but the extent of this association is not yet fully understood. O. Berg used Sonder's *Myrtaceae* in his studies and important collectors well represented are K. Moritzi, A. F. Regnell, C. F. P. Martius, F. Sellow and J. F. Widgren. The extent of the Brazilian material in Melbourne must be reckoned as substantial and should be taken into account for many studies on the flora of this and neighboring countries.

6. *Australia.* Sonder's collection of Australian plants is not as rich as those of some other regions and the two most important components are undoubtedly a good collection of L. Preiss specimens and numerous specimens transmitted to Sonder by Mueller. Most of the latter specimens returned to Melbourne when Sonder's collection was purchased.

7. *Central Europe.* Sonder's collection of central European material is extensive but it does not seem to be rich in autographic specimens.

8. *Algae.* Possibly the *Algae* formed the most important component of Sonder's collection and certainly Melbourne's holdings are extensive. Numerous autographic specimens from many well-known algologists are represented, e.g., C. A. Agardh, W. H. Harvey and Sonder himself. A comprehensive examination of the *Algae* by anyone without an extensive knowledge of the group would be imprudent at this stage because of the manner in which the material has been preserved.

9. *Ericaceae.* Evidently Sonder had resolved during the latter years of his life to study *Ericaceae* and acquired substantial collections (ca. 2,500 sheets) for examination. Amongst the most important of these were some J. C. Wendland and Thunberg types and many specimens annotated by J. C. Klotsch.

* National Herbarium of Victoria.

C. H. RIXON, Government Printer, Melbourne.